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AMSAT NEWS SERVICE
ANS-126

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The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, the Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on https://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

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ANS-126 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2024 May 05

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Greencube Terminal Program: Version 1.0.0.90 Enhancements and Updates

The Greencube Terminal Program, developed by Carsten Groen, OZ9AAR, has taken another leap forward in its evolution with the launch of Version 1.0.0.90. This latest update brings a number of enhancements and fixes geared towards bolstering operational efficiency and enriching the user experience, particularly for IO-117 satellite enthusiasts.

One of the standout features of this update is the integration of UHM 2.1 (yoU Heard Me), supplanting the older UHM 2.0. It's imperative for users to make the switch before May 14th, as UHM 2.0 will quit working thereafter. In the Live World View (LWV), users now have the flexibility to customize the positioning of the "radar view" of the current pass on the screen, allowing for more tailored satellite tracking experiences. Moreover, a bug that caused the frequency/band to default to 435.310 MHz regardless of the satellite selected when logging stations has been rectified.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Greencube-Terminal-1.0.0.90-Live-World-View.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Greencube-Terminal-1.0.0.90-Live-World-View.jpg>
Greencube Terminal Live World View [Credit: Carsten Groen, OZ9AAR]

Several user-requested enhancements have been incorporated, including the addition of time stamps (HH:MM:SS) when copying selected lines to the clipboard in the Traffic window and the removal of

limitations on the length of callsigns (excluding SSID) in AX.25 mode so the full 6-character callsigns in AX.25 are supported. Additionally, users can now integrate their horizon into the "radar view" in LWV by defining horizon definitions in a text file.

Noteworthy improvements have also been made to message handling within the Terminal program. These include fixes to parsing issues with local TLE data caused by duplicate NORAD numbers and adjustments to the way UHM paints lines in the Traffic view to address reported errors. Furthermore, enhancements to LoTW status checks now ensure that updates occur automatically every 12 hours based on user-configured preferences, streamlining the process and ensuring accuracy.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Greencube-Terminal-1.0.0.90-Terminal-View.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Greencube-Terminal-1.0.0.90-Terminal-View.jpg>
Greencube Terminal Main Screen with UHM 2.1 [Credit: Carsten Groen, OZ9AAR]

The introduction of Live QSO Viewer (LQV) and Live World View (LWV) offers users innovative graphical representations of satellite traffic and station locations, enhancing situational awareness and operational efficiency. Additionally, the integration of GPS in version 1.0.0.84 enables users to connect GPS receivers for automatic grid location updates, simplifying tracking and reporting, especially for mobile users.

With the addition of features such as UHM integration, expanded satellite selection, and improved message handling, users can anticipate a more robust and user-friendly experience with the Greencube Terminal Program v1.0.0.90. These updates underscore a commitment to continuous improvement and innovation, ensuring Greencube Terminal Program remains the most popular application for GreenCube satellite communications. More information about installation, features, and updates can be found on Carsten's website: https://www.moonbounce.dk/hamradio/greencube-terminal-program.html.

[ANS thanks Carsten Groen, OZ9AAR, for the above information]

Chang'e-6 Successfully Launches: China's Historic Lunar Mission Begins

China's Chang'e-6 mission embarked on its historic journey on May 3rd, launching aboard a Long March 5 rocket from the Wenchang Satellite Launch Center on Hainan Island, China. This mission aims to retrieve samples from the far side of the Moon, a feat never before achieved. The spacecraft is set to undergo a 53-day voyage to the Moon and back, where it will collect lunar soil and rocks, offering invaluable insights into the Moon's ancient history.

The mission targets the Moon's South Pole-Aitken (SPA) basin, a region of particular interest due to its potential to unveil crucial information about the Moon's past. This basin, formed by an ancient impact, holds clues about the events that shaped both the Moon and Earth billions of years ago, providing an opportunity to understand the differences between the near and far sides of the Moon.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Change-6-Spacecraft-in-Lunar-Orbit.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Change-6-Spacecraft-in-Lunar-Orbit.jpg>
Rendering of Chang'e-6 Spacecraft in Lunar Orbit. [Credit: Chinese National Space Agency (CNSA)]

Unlike previous lunar missions, which primarily focused on the near side, Chang'e-6 will explore the challenging terrain of the far side. Landing and communicating on this side of the Moon require sophisticated technology, including communications relay satellites. China, having achieved the first successful lunar far-side landing in 2019 with Chang'e-4, now endeavors to bring back samples from this uncharted territory.

The Chang'e-6 spacecraft is comprised of four components: an orbiter, lander, ascender, and reentry module. Upon reaching lunar orbit, the lander and ascender will descend to the Moon's surface, collect approximately 2 kilograms (4.4 pounds) of lunar material using specialized tools, and return to lunar orbit. The orbiter will then carry the samples back to Earth, releasing the reentry module into the atmosphere for a soft landing.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Change-6-Planned-Lunar-Landing-Site.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/Change-6-Planned-Lunar-Landing-Site.jpg>
Chang'e-6 Spacecraft's Landing Site on the Moon's SPA Basin. [Credit: Chinese National Space Agency (CNSA)]

During its 53-day mission, Chang'e-6 will communicate with Earth through the Queqiao-2 relay satellite,

which features a large parabolic antenna. This communication link will enable scientists to monitor and control the mission's progress and ensure the safe return of valuable lunar samples.

The scientific significance of Chang'e-6 extends beyond lunar exploration. The samples it retrieves will shed light on the Solar System's tumultuous past, particularly the Late Heavy Bombardment period around 3.9 billion years ago. By studying the SPA basin's age and composition, scientists hope to discern the origins of this event and its implications for Earth's history and the potential for life elsewhere in the universe.

[ANS thanks Jason Davis, The Planetary Society, for the above information]

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The 2024 AMSAT President's Club coins are here now!
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Join the AMSAT President's Club today and help
Keep Amateur Radio in Space!
https://www.amsat.org/join-the-amsat-presidents-club/
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NASA Reveals SpaceX's Innovative Plan for Starship Refueling in Orbit

NASA recently outlined SpaceX's plans for refueling Starships in low-Earth orbit, a critical step toward enabling ambitious lunar missions. Scheduled for next year, this demonstration involves linking two Starships in orbit. Under contract with NASA's Artemis program, SpaceX aims to supply human-rated Starships for lunar landings, although the targeted 2026 launch for Artemis III highlights the project's ambitious nature. Last year, NASA awarded a contract to Blue Origin, providing alternative options for lunar missions. Both companies designed their landers with future refueling capabilities, allowing for multiple missions and potential resource utilization on the Moon or Mars.

Amit Kshatriya, leading NASA's "Moon to Mars" program, outlined SpaceX's strategy for in-space refueling during a recent meeting. Despite challenges, progress is evident as SpaceX prepares for upcoming Starship test flights, aiming to tackle crucial technical hurdles. Before lunar missions become a reality, mastering in-space refueling is essential. SpaceX plans to demonstrate large-scale propellant transfer between two Starships in orbit next year. This milestone follows a successful cryogenic propellant transfer test during a previous Starship flight, funded by NASA.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/SpaceX-Starships-Docked-in-Orbit.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/SpaceX-Starships-Docked-in-Orbit.jpg>
Artist's Illustration of Two SpaceX Starships Docked in Orbit. [Credit: SpaceX]

With each test flight, SpaceX aims to enhance capabilities necessary for lunar landings. These include precise booster landings, in-orbit engine restarts, and controlled reentries-a prerequisite for deep space exploration. SpaceX's long-term goal of frequent Starship launches hinges on rapid reusability, aligning with Elon Musk's vision. Despite the challenges, progress is tangible, with plans underway to establish additional launch infrastructure in Texas and Florida.

The upcoming refueling demonstration involves autonomously linking two Starships in orbit, a task not without complexities. Yet, leveraging experience from Dragon capsule missions, SpaceX aims to navigate these challenges. The propellant transfer process relies on a pressure differential mechanism, simplifying the flow between donor and recipient tanks. Fine-tuning this procedure is crucial to avoid propellant loss during transfers.
[https://www.amsat.org/wordpress/wp-content/uploads/2024/05/SpaceX-Cryogenic-Transfer-Demonstration.jpg]<https://www.amsat.org/wordpress/wp-content/uploads/2024/05/SpaceX-Cryogenic-Transfer-Demonstration.jpg>
Plans for SpaceX's Ship-to-Ship Cryogenic Transfer Demonstration. [Credit: NASA/Amit Kshatriya]

Success in these demonstrations will determine the number of refueling tankers required for lunar missions. While predictions exist, practical tests will validate these estimates, ensuring mission success. As SpaceX pushes boundaries, industry experts emphasize the importance of collaboration and innovation. With a resilient team and the right attitude, SpaceX aims to overcome challenges and pioneer the next era of space exploration. While ambitious, SpaceX's endeavors signify a paradigm shift in space exploration, driven by a collective vision of advancing humanity's reach beyond Earth's orbit.

[ANS thanks Stephen Clark, Ars Technica, for the above information]

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GridMasterMap Satellite Top 100 Rovers May 2024 Rankings

The May 2024 rankings for the Top 100 Rovers (Mixed LEO/MEO/GEO) in satellite operations, as determined by @GridMasterMap<https://twitter.com/GridMasterMap> on Twitter, has been released. The ranking is determined by the number of grids and DXCC entities activated, taking into account only those grids where a minimum number of QSOs logged on the gridmaster.fr<http://gridmaster.fr> website have been validated by a third party. Grid numbers do not directly reflect the exact number of activations. Satellite operators are encouraged to upload their LoTW satellite contacts to https://gridmaster.fr in order to provide more accurate data.

Updated: 2024-05-01
1
ND9M
26
N5BO
51
SP5XSD
76
FG8OJ
2
NJ7H
27
K8BL
52
AD7DB
77
PT9BM
3
JA9KRO
28
LU5ILA
53
JL3RNZ
78
KJ7NDY
4
N5UC
29
KE4AL
54
F4DXV
79
KI7UXT
5
UT1FG
30
DL2GRC
55
KE9AJ
80
YU0W
6
OE3SEU
31
VE3HLS
56
KI7QEK
81
WA9JBQ
7
DL6AP
32

KB5FHK
57
PA3GAN
82
N4DCW
8
WI7P
33
KI7UNJ
58
N8RO
83
HB9GWJ
9
HA3FOK
34
LA9XGA
59
XE1ET
84
KB2YSI
10
K5ZM
35
F4BKV
60
KM4LAO
85
N0TEL
11
N6UA
36
N7AGF
61
VE1CWJ
86
VE3GOP
12
N9IP
37
JO2ASQ
62
SM3NRY
87
KI0KB
13
WY7AA
38
XE3DX
63
N4UFO
88
JM1CAX
14
W5PFG
39
K7TAB
64
VA3VGR
89
CU2ZG
15
AK8CW
40

KE0PBR
65
W1AW
90
K0FFY
16
AD0DX
41
KE0WPA
66
VA7LM
91
KG4AKV
17
DP0POL
42
N6DNM
67
PT2AP
92
AF5CC
18
WD9EWK
43
PR8KW
68
M1DDD
93
VE6WK
19
AD0HJ
44
AC0RA
69
DL4EA
94
W8MTB
20
ON4AUC
45
EB1AO
70
AA8CH
95
VE7PTN
21
KX9X
46
JK2XXK
71
N4AKV
96
DK9JC
22
KG5CCI
47
W7WGC
72
LU4JVE
97
K6VHF
23
ND0C
48

EA4NF
73
VE1VOX
98
N6UTC
24
DJ8MS
49
VK5DG
74
W8LR
99
PT9ST
25
F5VMJ
50
AA5PK
75
DF2ET
100
VO2AC

[ANS thanks @GridMasterMap<https://twitter.com/GridMasterMap> for the above information]

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Need new satellite antennas?
Purchase an M2 LEO-Pack from the AMSAT Store!<https://www.amsat.org/shop/>
[https://www.amsat.org/wordpress/wp-content/uploads/cm/LEO-Pack1-300x298.png]<https://www.amsat.org/product/m2-leo-pack-antenna-system/>
When you purchase through AMSAT, a portion of the proceeds goes towards
Keeping Amateur Radio in Space.
https://amsat.org/product-category/hardware/
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Changes to AMSAT-NA TLE Distribution for May 3, 2024

Two Line Elements or TLEs, often referred to as Keplerian elements or keps in the amateur community, are the inputs to the SGP4 standard mathematical model of spacecraft orbits used by most amateur tracking programs. Weekly updates are completely adequate for most amateur satellites. TLE bulletin files are updated daily in the first hour of the UTC day. New bulletin files will be posted immediately after reliable elements become available for new amateur satellites. More information may be found at https://www.amsat.org/keplerian-elements-resources/.

Correction to last week's addition:
KASHIWA NORAD Cat ID 59508 Correct downlink 437.3753 MHz (Thanks Nico PA0DLO)

The following satellites have been removed from this week's AMSAT-NA TLE distribution:
NIUSAT NORAD Cat ID 42766 Decayed from orbit on or about 27 April 2024
ExoCube 2 NORAD Cat ID 47319 Decayed from orbit on or about 30 April 2024

[ANS thanks AMSAT Orbital Elements page for the above information]

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ARISS NEWS

Amateurs and others around the world may listen in on contacts between amateurs operating in schools and allowing students to interact with astronauts and cosmonauts aboard the International Space Station. The downlink frequency on which to listen is 145.800 MHz worldwide.

+ Recently Completed Contacts

Centennial Campus Magnet Middle School Center for Innovation, Raleigh, NC, telebridge via K6DUE
The ISS callsign was NA1SS
The scheduled crewmember was Matthew Dominick KCØTOR
The ARISS mentor was AA6TB

Contact was successful: Wed 2024-05-01 12:03:49 UTC
Watch for Livestream at: https://www.youtube.com/watch?v=lnAZJknxsgw

Wireless Institute of Australia / Bundaberg High School Amateur Radio Club, Bundaberg, Queensland, Australia, telebridge via VK6MJ
The ISS callsign was NA1SS
The scheduled crewmember was Mike Barratt KD5MIJ
The ARISS mentor was VK4KHZ
Contact was successful: Sat 2024-05-04 10:28:24 UTC

+ Upcoming Contacts

Eric Knows CIC, Newcastle upon Tyne, United Kingdom, telebridge via K6DUE
The ISS callsign is presently scheduled to be NA1SS
The scheduled crewmember is Matthew Dominick KCØTOR
The ARISS mentor is MØXTD
Contact is go for: Sat 2024-05-11 08:42:32 UTC

The crossband repeater continues to be active (145.990 MHz up {PL 67} & 437.800 MHz down). If any crewmember is so inclined, all they have to do is pick up the microphone, raise the volume up, and talk on the crossband repeater. So give a listen, you just never know.

The packet system is also active (145.825 MHz up & down).

As always, if there is an EVA, a docking, or an undocking; the ARISS radios are turned off as part of the safety protocol.

Note, all times are approximate. It is recommended that you do your own orbital prediction or start listening about 10 minutes before the listed time.

The latest information on the operation mode can be found at https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information]

Upcoming Satellite Operations

A growing number of satellite rovers are currently engaged in sharing their grid square activations on https://hams.at. By visiting the website, you gain easy access to comprehensive information about the operators responsible for activating specific grid squares. Additionally, you have the ability to assess the match score between yourself and a particular rover for a given pass, while also being able to identify the upcoming satellite passes that are accessible from your location.

[ANS thanks Ian Parsons, K5ZM, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

Dayton Hamvention 2024
Friday May 17th - Sunday May 19th
Greene County Fairgrounds and Expo Center
120 Fairground Road
Xenia, OH 45385
https://hamvention.org
38th Annual Small Satellite Conference
August 3-8, 2024
Logan, UT, USA
https://smallsat.org<https://smallsat.org/>

[ANS thanks the AMSAT Events page for the above information]

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Want to fly the colors on your own grid expedition?
Get an AMSAT car flag and other neat stuff from our Zazzle
store<https://www.zazzle.com/store/amsat_gear>!
25% of the purchase price of each product goes towards Keeping Amateur Radio in Space
[https://www.amsat.org/wordpress/wp-content/uploads/2024/01/AMSAT-Car-Flag-e1705691761784-300x235.png]<
https://www.zazzle.com/amsat_car_flag-256716714380264543>
Keeping Amateur Radio in Space
https://www.zazzle.com/amsat_gear
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Satellite Shorts From All Over

+ Congratulations are in order for RJ Bragg, WY7AA, and Andrew Northam, KE8FZT, for their impressive accomplishments in earning GridMaster Awards #64 and #65, respectively! This esteemed recognition, initiated by Star Comm Group in 2014 and backed by Damon Runion, WA4HFN, and Rick Tillman, WA4NVM, has now been entrusted to AMSAT for the benefit of the entire amateur satellite community. The GridMaster Award celebrates radio amateurs worldwide who achieve two-way communication via amateur satellite with operators in all 488 Maidenhead grids across the contiguous United States of America. For more details on this distinguished award, visit the AMSAT website at https://www.amsat.org/gridmaster/. Andrew and RJ, your achievement is truly commendable-well done! (ANS thanks Bruce Paige, KK5DO, AMSAT Director of Contests and Awards for the above information)

+ AMSAT Italia proudly announces the acquisition of ownership of the IO-117 "GreenCube" satellite, with Sapienza University retaining partial ownership. Through collaboration, the satellite will continue amateur radio operations post-primary scientific mission completion, preventing its decommissioning. This transfer of legal responsibility from the Italian Space Agency to AMSAT Italia solidifies the satellite's exclusive amateur radio use. Originally named GreenCube, it was developed by Sapienza University, ENEA, and University of Naples Federico II, with AMSAT Italia contributing to its design. On October 29, 2022, GreenCube became the first ham radio satellite to operate in a MEO orbit, designated as Italy-OSCAR 117 (IO-117) by AMSAT. AMSAT Italia, Sapienza Space Systems, and Space Surveillance Laboratory commit to operating the satellite for continued service to the amateur radio community. (ANS thanks AMSAT Italia for the above information)

+ Boeing's Crew Flight Test (CFT) of the CST-100 Starliner spacecraft is scheduled for Monday, May 6, with a targeted launch time of 10:34 p.m. EDT. Led by Commander Barry "Butch" Wilmore and Pilot Suni Williams, both experienced NASA astronauts, this mission comes after over a decade in development. The duo will spend at least eight days aboard the International Space Station (ISS) conducting various flight test objectives before returning for a solid-ground landing. Wilmore and Williams will be the first humans to fly atop the United Launch Alliance (ULA) Atlas V rocket since 1963 and execute the first "land" landing of a crew-carrying U.S. spacecraft since 2011. Originally not slated for this mission, Wilmore and Williams stepped in after several crew changes, with Williams set to become the first woman to fly the maiden voyage of a new orbital-class vehicle. Deep into pre-flight quarantine, the astronauts express their readiness, acknowledging the challenges and the learning opportunities that lie ahead in this ambitious test flight. (ANS thanks Ben Evans, AmericaSpace, for the above information)

+ On April 25, 2024, Roscosmos cosmonauts Oleg Kononenko and Nikolai Chub conducted a successful spacewalk, lasting four hours and 36 minutes, to install communication and corrosion analysis equipment on the International Space Station (ISS). The spacewalk aimed to deploy a communications system and install equipment to analyze corrosion levels on station surfaces. Kononenko, with seven spacewalks under his belt, and Chub, on his second, completed their tasks, including deploying a panel for a synthetic radar communications system on the Russian segment of the ISS. This mission marked the 270th spacewalk for assembly, maintenance, and upgrades of the space station, with Kononenko and Chub having arrived at the station on September 15, 2023, aboard the Soyuz MS-24 spacecraft. (ANS thanks SciTechDaily.com, for the above information)

+ Two new Galileo navigation satellites were launched from Kennedy Space Center on Saturday, April 27th, at 8:34 p.m. EDT, bolstering the system's constellation to 30 satellites and amplifying reliability and precision for billions of users globally. Since its inception in 2016, Galileo has been pivotal across various sectors such as rail, maritime, agriculture, and rescue operations, contributing significantly to the EU's GDP, with 10% reliant on satellite navigation. This launch follows the recent

introduction of the new Public Regulated Service signals, further solidifying Europe's independence in satellite navigation. Notably, this marks the first time Galileo satellites have been launched aboard an American-made rocket, a significant development amid Europe's diminishing space collaboration with Russia. (ANS thanks the European Space Agency, for the above information)

+ SpaceX's 30th Dragon cargo mission successfully returned to Earth, splashing down off the coast of Florida in the early hours of April 30th. Departing from the International Space Station on April 28th, the capsule completed its mission under the CRS-30 contract with NASA. Loaded with over 4,100 pounds of supplies and scientific experiments, Dragon is unique in its capability to safely bring gear back from the ISS, unlike other operational spacecraft that burn up upon reentry. This return enables quick transportation of experiments to NASA's facilities for data collection. Meanwhile, another SpaceX vehicle remains docked at the ISS, supporting the Crew-8 astronaut mission for NASA, launched in early March. (ANS thanks Mike Wall, Space.com, for the above information)

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In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half-time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org<http://amsat.org> for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Mitch Ahrenstorff, ADØHJ
ad0hj [at] amsat.org<http://amsat.org>